Fall 9-1-2020

HEO 151.B01: Service and Maintenance

Lawrence S. Reinholz
University of Montana, Missoula, larry.reinholz@mso.umt.edu

THE UNIVERSITY OF MONTANA MISSOULA
COLLEGE OF TECHNOLOGY
INDUSTRIAL TECHNOLOGY DEPARTMENT

COURSE SYLLABUS

COURSE NUMBER AND TITLE: HEO151T SERVICE AND MAINTENANCE

DATE REVISED: Fall 2020

SEMESTER CREDITS: 2

CONTACT HOURS PER SEMESTER: 75

Lecture hours per week	1
Lab hours per week	2
Shop hours per week	2

PREREQUISITES: None

INSTRUCTOR NAME:	Larry Reinholz
E-MAIL ADDRESS:	larry.reinholz@mso.umt.edu
PHONE NUMBER :	406-243-7643
OFFICE LOCATION :	West Campus 2795 37th Avenue
OFFICE HOURS:	8:00-4:00 M-F lab/office

RELATIONSHIP TO PROGRAM

Develop student's knowledge and understanding of mechanical skills needed for light-duty maintenance and service as well as basic mechanical skills necessary to identify major components and their functions and prepare the program's equipment for field activities.

COURSE DESCRIPTION:

(First half) A study of types of lubricants and their use; the importance and procedures of scheduled and preventive maintenance; safety stands and requirements. (Second half) Basic principals of diesel and gas engines, hydraulics, power trains, undercarriages, and other heavy equipment components.

STUDENT PERFORMANCE OUTCOMES:

Occupational Performance Objectives	Life-Long Learning Skill Codes*
Upon completion of this course, the student will be able to:	
1. Read, understand, utilize various service	BSKL 1,3; THINK 2,6 INFO 1

2. Perform service and maintenance safety	THINK 2,4,6
3. Complete service reports	BSKL 1,2; INFO 1,2,3
4. Work as part of a service team	BSKL4,5;PQ1,2;IPS 1,3,4,5 THINK 2,3;RSRC 1,3
5. Identify major mechanical components and their function	BSKL 1,2;INFO1,2,3
6. Identify and correct minor mechanical malfunctions	THINK 1,2,3,6;INFO1,2,3 SYS 1,2;TECH 1,3

STUDENT PERFORMANCE ASSESSMENT METHODS AND GRADING PROCEDURES:

Grade:	93% - 100%	=	A
	85% - 92%	=	B
	75% - 84%	=	C
	65% - 74%	=	D
	64% below	=	F

Grades will be determined by the following:

Lab	40%
Tests	20%
Attendance	20%
Participation	20%

Note:

1. No excuses for absence or late attendance.
2. Missed tests, quizzes, and homework will result in a 0% grade. No make-ups.
3. Please bring your hard hate, safety vest, and safety glasses with you to every class. You cannot attend class without them. Coveralls are recommended but not required.

OTHER POLICIES:

HOW VARIOUS ASSESSMENT METHODS WILL BE USED TO IMPROVE THE COURSE:

1. Student course evaluations.
2. Student field performance spring quarter.
3. Program directors evaluation of student performance

ATTENDANCE -

1. ATTENDANCE IS NOT DISCRETIONARY. Students are expected to attend all scheduled classes and labs and complete assignments.

2. Unannounced quizzes will be given and will NOT be made up if missed.

3. Scheduled tests may be made up with prior arrangement.

4. A 10% grade deduction is binding on make-up tests.

5. Equipment operation schedules will be followed, and missed field sessions will not be rescheduled.

6. Two unexcused absences will drop your final grade one letter grade. Each unexcused absence after that, continues to drop the final grade by one letter until the grade of 'F' is reached, at which time the student will be asked to withdraw from the class. Classes begin at 10 minutes past the hour, UNLESS the instructor has notified students of a change the previous day. Late arrival to a class session will be treated as a half day unexcused absence for that half day session (those half day absences will contribute to the two unexcused absence rule). Excused absences are for illness or medical reason which is supported by a doctor's note, or when asked by the instructor to leave for the day when the student is obviously ill. Family emergency will be considered excused by the instructor on a case by case basis.

REQUIRED TEXT: Machine operator's manuals (USED IN HEO146)
OPERAING TECHNIQUES (USED IN HEO146)

SUGGESTED REFERENCE MATERIALS:

Supplies:

1. Hard Hat
2. Safety Vest
3. Safety Glasses

COURSE OUTLINE: (1st Half)

1. Introduction to service
    A. Safety procedures
        1. Equipment
        2. Location
        3. Shop rules
        4. Blocking equipment
    B. Service Manuals
        1. Periodic service
        2. Maintenance procedures
        3. Service area locations
    C. Oils and fluids
        1. Engine
        2. Transmission (manual and powershift)
        3. Hydraulic
        4. Differentials and final drives
        5. Brakes
        6. Power steering
    D. Filters
        1. Oil
        2. Air
        3. Hydraulic
        4. Fuel
        5. Coolant
        6. Transmission
        7. Final drive
    E. Cooling systems
        1. Coolants and radiators
        2. Oil Coolers
        3. Transmission coolers
        4. Air coolers
    F. Electrical systems
        1. Safety
        2. Batteries
        3. Starters
        4. Alternators/generators
        5. Lights/special equipment
    G. Miscellaneous
        1. Tires
        2. Tracks
        3. Maintenance w/o service manuals (rules of thumb)

II. Service of all equipment
    A. Usage and hours of machine
        1. 10 hour service
        2. 200 hour service
        3. 500/1000 hour service
    B. Cleaning of equipment
    C. Hand and power tools
        1. Safety
        2. Wrenches
        3. Impact tools
        4. Hammers
        5. Chisels
        6. Drills
        7. Grinders
    D. Oil filter change
        1. Tools
        2. Procedures
    E. Hydraulic service
        1. Tools
        2. Procedures
    F. Power train service
        1. Tools
        2. Procedures
        3. Zerk fittings
        4. Grease guns
        5. Air brake service

III. Periodic adjustments
    A. Clutches
    B. Belts
    C. Track adjustment
    D. Wheels and tire pressures
    E. Control linkage

IV. Service for specific equipment
    A. TD15 dozer, TS14 Scraper, W24C End Loaders; 310A Backhoe, T500M Grader; 710-A Grader, Dump Trucks, 613 Scraper; MRS 14 Scraper; Vibratory Roller, HEO Support Vehicles.

COURSE OUTLINE: (2ND half)

I. Fundamentals of heavy equipment
   - A. Using operator, parts, service and maintenance manuals
   - B. Principles of gasoline engines
   - C. Diesel engine principles
   - D. Power train principles
   - E. Hydraulic system principles
   - F. Electrical system principles

II. Component identification and inspection
   - A. Engines
   - B. Starters
   - C. Alternators
   - D. Pumps
     1. Water
     2. Power steering
     3. Fuel
   - E. Transmissions
   - F. Differentials
   - G. Drive lines
   - H. Brake systems
   - I. Hydraulic systems
   - J. Cutting edge and teeth replacement
   - K. Undercarriages

III. Equipment services and repair
   - A. Dependent on needed repairs of equipment – will vary from year to year.
   - B. Every student will receive basic, hands-on knowledge of engines, Power trains, starters, transmissions, differentials, and hydraulic systems.

Criteria for daily lab points:

5 points -
– Arrived on time for class and stayed through the class period.
- Student was prepared and had all items needed for the day's projects.
- Attentive through the lab, participated in assignments, asked questions and attempted to utilize suggestions to improve skills.
- Student was focused on class details.

4 points –
- Arrived on time for class and stayed through the class period.
- Student was prepared and had all items needed for the day's projects.
- Participation level was not satisfactory or student did not heed instructor assignments or suggestions.

3 points –
- Arrived on time for class and stayed through the class period.
- Student was prepared and had all items needed for the day's projects.
- Student did not participate or was not attentive; student was not focused (i.e. talking while instructor was lecturing).

2 points –
- Student could not attend class for reasonable cause and prior notification was given to the instructor.

1 point –
a- Student was late for class without prior notification to the instructor, OR with a reasonable and documentable explanation.
- Student did not come prepared for class assignment.
- Student blatantly violated a safety guideline or was suspended from class for doing so.

NO points –
- Student did not attend class and no prior arrangement was made with instructor.

note: Student is responsible to call instructors office phone number OR email instructor if unable to attend class or will be tardy. That contact information is listed in the syllabus.

The attendance policy is stated in the syllabus. Note that final grade for the class will drop after 2 absences.

NAME:_____ **DATE:**_____

SIGNATURE:_____

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